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ABSTRACT

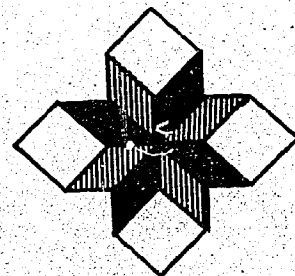
This document suggests ways of setting up a "Math Resource Center" and ideas for particular resources. Briefly discussed are the following: purpose of a resource center; supervision; physical facilities; and materials-library, math lab and games, computer, audio-visual materials, and office machines. Lists in the appendices include: journals, paperback booklets, selected bibliographies, selected sources of math lab equipment, games, and enrichment materials, commercial producers of materials for mathematics teaching, resource books, and commercially produced activity cards and packages. (Author)

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THE MATH RESOURCE CENTER



for SECONDARY SCHOOLS

To: Mathematics Educators and Department Chairmen
From: Alan D. Nicholson, Mathematics-Science Supervisor
Re: Mathematics Resource Centers

As you continue to look for new ways to improve and strengthen the mathematics curriculum in your school you may wish to consider a resource center. This document is intended to suggest some ways such a center could be used as well as some ideas for particular resources.

The type of resource center you will be able to institute in your school will depend upon the size of the school and the time and money available. In some cases the resource center will be part of a larger media center or library. It might consist of a table and some shelves at the back of a classroom. Or it may be a more elaborate setting with individual student carrels, a workroom, and a place for quiet reflection.

Many of the resources are expensive; many of them are not. If given time to do so, a great many resources can be collected and constructed by an individual teacher or a small group of teachers working on a limited budget. The centers can be enlarged and improved over a period of several years. Some budgetary and time commitments must, however, be made by the school. In a few cases, federal grants or matching funds may be used for this purpose; the school administrator should know of the availability of such funds.

If you decide you would like to institute a mathematics resource center in your school, I suggest you begin by working together with your administrator, with fellow teachers, and with students to develop a written plan for its implementation. You might start by ordering free catalogs, free materials and bibliographies. Since a resource center is in many ways a broad application of classroom mathematics laboratory techniques, the resource books listed in Appendix III on "Activity Packages" will prove helpful.

If I can be of assistance to you or your school in this endeavor, please don't hesitate to call on me.

ADN/wbc

THE MATHEMATICS RESOURCE CENTER FOR SECONDARY SCHOOLS

INTRODUCTION

THE MATHEMATICS RESOURCE CENTER SHOULD BE THE PRODUCT OF THE COMBINED EFFORTS OF STUDENTS AND TEACHERS AT THE LOCAL LEVEL.

The Mathematics Resource Center, like many other educational innovations, depends for its success upon the grassroots participation at the planning and development stage of those who will use it and those who will supervise it. The students and teachers of a school must commit themselves to the establishment of a resource center which suits their particular needs and which conforms to their particular philosophy. The following statements and ideas, therefore, are offered only as suggestions which should be accepted or rejected on the basis of the particular situation.

PURPOSE

THE ESTABLISHMENT OF A MATHEMATICS RESOURCE CENTER CAN STRENGTHEN THE ENTIRE CURRICULUM.

Such a center can be a workroom for personal, individual study as well as for individual instruction and small group seminars. It can be a place for investigation of new topics, for remedial work, for make-up work, and for teachers conferences. It can be a laboratory for model building and for project work. It can be a retreat where students can play mathematical games, solve puzzles, and pursue recreational mathematics of all types, free from the emotional pressures and intellectual confinement of the classroom. It can be a place where at least some students can come to know, at their own level, the excitement and the intrinsic beauty of mathematics and the potential for creativity and enjoyment its pursuit offers.

THE CENTER MUST BE AVAILABLE TO STUDENTS AT THEIR OWN DISCRETION.

It will be necessary, on occasion, for the teacher to encourage or request students to come to the resource center for such things as conferences, remedial help, make-up work and the like. But, if the center is to serve as a place where students can enjoy mathematics, where they can study topics of their own choosing, at their own rate, where they can discover how to learn mathematics and where they can begin to take responsibility for their own learning, then extreme care must be taken to insure that the center will be available to students at their own discretion.

IT IS IMPORTANT THAT STUDENTS HAVE INCREASED FREE TIME.

Since a major purpose of the Mathematics Resource Center is to encourage creative use of free time and to promote effective, self-motivated individual study of mathematics it follows that each student should have unscheduled time during the day. Independent study advocates suggest that as much as 40 per cent of the student's time be unstructured. Study halls would be counted in this free time only if students were allowed to choose alternatives such as the resource center.

MORE UNSCHEDULED TIME CAN BE PROVIDED.

Additional free time for students might be arranged for by modifying the traditional instructional sequence, by utilizing flexible scheduling, by adjusting class sizes, by organizing for instructional innovation such as team teaching or by making use of para-professional teaching aides. Consideration should be given to making the centers available during non-school hours.

SUPERVISION

SUPERVISION SHOULD BE DONE BY TRAINED PERSONNEL.

The Mathematics Resource Center should be attended by a person trained in mathematics; ordinarily the librarian won't do. If the school is sufficiently large, scheduling may permit each mathematics teacher to spend part of the day in the center. In some cases it may be desirable to give one mathematics teacher primary responsibility for the center and to adjust his teaching schedule accordingly. If possible, teacher aides could be utilized to assist with the more routine aspects. The attending teacher should make every effort to play the role of consultant and should avoid dominating the activities.

IT'S A PLACE FOR TEACHERS, TOO.

The Mathematics Resource Center should also be a place where the teacher can pursue his professional and recreational interests in mathematics. It should contain appropriate journals, books and materials to allow him to do so.

PHYSICAL FACILITIES

THE MATHEMATICS RESOURCE CENTER SHOULD CONTAIN AT LEAST TWO DISTINCT AREAS.

The center should include a relatively quiet area where students can carry on individual study with a minimum of interruption and an area designed to encourage small group interaction and math-lab activities. With proper planning, it should be possible to arrange for both areas in a single room. If one must be sacrificed, however, it should probably be the study area.

THE INDIVIDUAL STUDY AREA SHOULD PROVIDE FOR MINIMUM INTERUSION.

The study area might consist of individual carrels where students can read, write, ponder and carry on subdued conversations. It could be separated from the activity area by blackboard partitions or bookshelves, although this should not be necessary.

THE ACTIVITY AREA SHOULD BE FLEXIBLE.

The activity area should of course be equipped with a variety of working surfaces including tables. Lab benches complete with water and gas would be nice but not vital. The furniture should be flexible enough to allow a number of alternative arrangements depending upon the particular activity being performed. A number of comfortable lounge chairs and carpeting would not be out of place. Unless the library can accommodate the resulting confusion, the Mathematics Resource Center should be separate from it.

MATERIALS

INSOFAR AS POSSIBLE STUDENTS SHOULD BE GIVEN THE FREEDOM AND RESPONSIBILITY FOR PLANNING THEIR ACTIVITIES AND USING THE MATERIALS.

It might also be desirable to give direction to students who need it through such things as single concept activity packets. Some ideas for the development of activity packages and other instructional devices are given in the appendices.

THE MATERIALS THEMSELVES ARE AS IMPORTANT AS HOW STUDENTS ARE ALLOWED TO USE THEM.

The materials suggested here by no means exhaust the possibilities. As educational innovations are made and as we move toward a more student-centered curriculum, the Mathematics Resource Center will be an ever changing and increasingly important part of the curriculum. Materials are broken into five categories with references to particular resources in the appendices.

1. LIBRARY

THE MATHEMATICS LIBRARY BELONGS IN THE RESOURCE CENTER.

One of the first problems which will be encountered, if the center is to be apart from the library, is that of convincing the librarian and others in authority that the mathematics library really belongs in the Mathematics Resource Center and not in the library proper. This assumes, of course, that the Center will be at least as accessible to the student as is the library. It also recognizes the unfortunate fact that in many school libraries there is a poverty of mathematics books and what books are there aren't being widely used.

THE CENTER SHOULD HAVE A WIDE VARIETY OF PRINTED MATERIALS.

In addition to text books and books on particular mathematical disciplines, there should be historical, biographical and recreational volumes. Many publishers print excellent single topic paperbound books on various subjects and levels. Some reasonably good programmed materials are available as well.

2. MATH LAB AND GAMES

ONE BASIC PRECEPT IN MATHEMATICS EDUCATION IS THAT, IN MOST CASES, THE CONCRETE MUST PRECEDE THE ABSTRACT.

The mathematics laboratory not only allows the student to actively participate in his learning but makes it meaningful as well. Apparatus could include construction materials for model building, various devices for weighing and measuring; telescopes; printed software; sliderules; mechanical drawing apparatus; pegboards; geometric shapes; oscilloscopes, ring stands, binary counters, optical benches, and other materials from the science lab; straight edges and compasses; and a blackboard. The list is inexhaustible.

GAMES AND PUZZLES NOT ONLY OFFER ENJOYMENT BUT HELP TO DEVELOP CREATIVE INSIGHT AND PROBLEM SOLVING SKILLS.

Many games are designed to help students develop or strengthen particular skills. Others have less obvious goals. The potential of the computer for game playing and puzzle solving should not be overlooked. Chess is a possibility.

3. COMPUTER

THE COMPUTER SERVES AS A MOTIVATIONAL INSTRUCTIONAL, AND EDUCATIONAL DEVICE.

The computer can serve as a focal point for many activities in the Mathematics Resource Center. Aside from its more common uses, the computer can be programmed to play games and solve simulation problems. Use of the computer can result in greater understanding of algorithmic and problem solving processes. The potential of computer assisted instruction (CAI) should be investigated.

LESS SOPHISTICATED CALCULATING MACHINES ARE NEEDED, TOO.

Whether or not a particular school can afford more sophisticated computers, the Resource Center should have desk calculators capable of performing the basic operations.

4. AUDIO-VISUAL MATERIALS

AUDIO-VISUAL MATERIALS MAKE POSSIBLE AN EXTENDED VARIETY OF EDUCATIONAL EXPERIENCES IN MATHEMATICS.

Films are becoming more inventive and interesting. Filmstrips and individual slides are quite inexpensive and slides can be locally produced. Single concept 8mm film loops are a relatively new and effective concept.

Audio tapes, particularly cassettes, are inexpensive and easy to use. Many commercially produced tapes are available but those produced locally to fit local needs are probably best. Video tape equipment is no longer prohibitively expensive. A number of video tape programs are also available commercially.

5. OFFICE MACHINES

SOME OFFICE MACHINES ARE NECESSARY IF BEST USE IS TO BE MADE OF THE CENTER.

If students and teachers are to get maximum use of the resources in the center, they should have at their disposal mathematics typewriters, a spirit duplicator and machines which will copy from books.

APPENDIX I

JOURNALS

1. *The Journal of Recreational Mathematics*

Greenwood Periodicals, Inc.
51 Riverside Avenue
Westport, Connecticut 06880

2. *School Science and Mathematics*

Central Association of Science and Mathematics Teachers
Box 246
Bloomington, Indiana 47401

3. *The Mathematics Teacher**

4. *The Arithmetic Teacher**

5. *The Mathematics Student Journal**

6. *Journal for Research in Mathematics Education**

*The National Council of Teachers of Mathematics
1201 Sixteenth Street, N.W.
Washington, D. C. 20036

7. *Educational Studies in Mathematics*

D. Reidel Publishing Company
Box 17
Dordrecht, Holland

8. *Mathematics Magazine***

9. *American Mathematical Monthly***

**The Mathematical Association of America
1225 Connecticut Avenue, N.W.
Washington, D.C. 20036

PAPERBACK BOOKLETS

The following list of individual booklets or series of booklets is by no means exhaustive. Most of the booklets treat individual topics, many of which are not found in the ordinary course of study, in a stimulating and interesting manner. Complete descriptions can be found in the catalogs of the various publishers. Grade levels are given where they are known.

Houghton Mifflin

1. *Mathematics Enrichment Series* -- 11 booklets -- Grades 7-12
2. *Flowcharting* Grades 7-12
3. *Introduction to Computer Programming*, Grades 7-12
4. *Modern Mathematics for Achievement* -- 16 booklets -- General Math
5. *Mathematics in the Making* -- 12 booklets -- Grades 3-8
6. *Experiments in Mathematics* -- 3 booklets -- Grades 7-10
7. *Contemporary School Mathematics Series* -- 8 booklets -- Grades 8-12

Random House- Singer

1. *New Mathematical Library* (MSG* -- 20 booklets, grades 9-12)

MSG*

A. C. Vroman, Inc.
2085 E. Foothill Boulevard
Pasadena, California 91109

This company, which publishes most of the MSG materials, prints a wide variety of excellent inexpensive mathematics booklets.

D. C. Heath

1. *Thinking with Mathematics*
2. *Topics in Mathematics* (excellent Russian translations)

Macmillan

1. *Macmillan Mathematics Supplements* -- 5 booklets, grades 9-12

NCTM -- National Council of Teachers of Mathematics

1201 Sixteenth Street, N. W.
Washington, D. C. 20036

1. NCTM publishes booklets for teachers and students too numerous to mention. NCTM Current Publications list may be ordered from the above address.

MSG* -- School Mathematics Study Group

Cedar Hall
Stanford University
Stanford, California 94305

To correspond directly with MSG and to be put on their mailing list to receive their newsletters, use the above address.

SELECTED BIBLIOGRAPHIES

1. *NCTM Current Publications*
2. *The High School Mathematics Library*
3. *A Bibliography of Recreational Mathematics*
Vol. 1 and Vol. 2

NCTM
1201 Sixteenth Street, N.W.
Washington, D.C. 20036

4. *CUPM Basic Library List (1965)*

CUPM Central Office
Box 1024
Berkeley, California 94701

5. *Mathematical Booklist for High School Libraries*

National High School and Junior College Mathematics Club
Mu Alpha Theta
University of Oklahoma
Norman, Oklahoma 73069

Send a self-addressed, stamped No. 10 envelope

APPENDIX II

SELECTED SOURCES OF MATH LAB EQUIPMENT, MATH GAMES, AND ENRICHMENT MATERIALS

(Catalogs will be sent upon request to publisher.)

Concept Catalog

Concept
Box 273
Belmont, Massachusetts 02178

Creative Publications

Creative Publications
P. O. Box 328
Palo Alto, California 94302

Cuisenaire Aids for Learning Mathematics Catalog

Cuisenaire Company of America, Inc.
12 Church Street
New Rochelle, New York 10805

Developmental Learning Materials

Developmental Learning Materials
3505 North Ashland Avenue
Chicago, Illinois 60657

Edmund Catalog

Edmund Scientific Company
300 Edscorp Building
Barrington, New Jersey 08007

Educational Teaching Aids for Early Learning and Special Education

Educational Teaching Aids Division
A. Diagger & Company
159 West Kinzie Street
Chicago, Illinois 60610

Ideal, Instructional Materials for Mathematics and Measurement, and Quality Instructional Material for all Grades, and Milton Bradley Aids for Elementary Mathematics (4 catalogs)

STAS Instructional Materials, Inc.
2100 Fifth Street
Berkeley, California 94710

J. Weston Walch Catalog

J. Weston Walch, Publisher
Box 1075
Portland, Maine 04104

Lakeshore Curriculum Materials

Lakeshore Curriculum Materials Equipment Company
1144 Montague Avenue
Box 2116
San Leandro, California 94577

Math Media Catalog

Math Media Division
H + M Associates
P. O. Box 1107
Danbury, Connecticut 06810

Math and Things (SEE), Inc.

Selective Educational Equipment, (SEE), Inc.
Three (3) Bridge Street
Newton, Massachusetts 02195

Mathematics U.S.A.

Midwest Publications Company, Inc.
P. O. Box 307
Birmingham, Michigan 48012

Secondary Teaching Aids

Math-Master
Division of Gamco Industries, Inc.
Box 1911A
Big Spring, Texas 79720

Walker Educational Catalog

Walker Educational Book Corporation
720 Fifth
New York City, New York 10019

COMMERCIAL PRODUCERS OF MATERIALS

FOR MATHEMATICS TEACHING

(List Courtesy of the Idaho Department of Education)

Associated School Distributors, Inc.
220 West Madison Street
Chicago, Illinois 60606

Berger Scientific Supplies, Inc.
37 William Street
Boston, Massachusetts 02119

Milton Bradley Company
74 Park Street
Springfield, Massachusetts 01102

Caddy-Imler Creations
Box 5097
Inglewood, California 90310

Cambosco Scientific Company
37 Antwerp Street, Brighton Station
Boston, Massachusetts 02135

Central Scientific Company
1700 Irving Park Road
Chicago, Illinois 60613

Circline Ruler Company
4609 Waveland Court
Des Moines, Iowa 50312

Corbett Blackboard Stencils
548 Third Avenue
North Pelham, New York 10803

Creative Playthings, Inc.
Princeton, New Jersey 08540

C-Thru Ruler Company
827 Windsor Street
Hartford, Connecticut 06120

Cuisenaire Company of America, Inc.
9 Elm Avenue
Mount Vernon, New York 10550

Daintee Toys, Inc.
230 Steuben Street
Brooklyn, New York 11205

Denny Press
1115 45th Street
Des Moines, Iowa 50311

Denoyer-Geppert Company
5235 Ravenswood Avenue
Chicago, Illinois 60640

Diwa Slide Rules
688 South Remington Road
Columbus, Ohio 43209

Edmund Scientific Company
101 E. Gloucester Pike
Barrington, New Jersey 08007

Educational Playthings
1706 Hayes Avenue
Sandusky, Ohio 44870

Educational Supply & Specialty Co.
2823 Gaye Avenue
Huntington Park, California 90255

Eugene Dietzgen Company
2425 Sheffield Avenue
Chicago, Illinois 60614

Ginn and Company
125 Second Avenue
Waltham, Massachusetts 02154

Houghton Mifflin Publishing Company
2 Park Street
Boston, Massachusetts 02122

Ideal School Supply Company
8312 Birkhoff Avenue
Chicago, Illinois 60620

Kenworthy Educational Service
138 Allen Street
Buffalo, New York 14201

Keuffel and Esser Company
127 Fulton Street
New York, New York 10038

Lapine Scientific Company
2229 McGee Avenue
Berkeley, California 94703

The Learning Center, Inc.
Princeton, New Jersey 08540

Math MasterLabs, Inc.
Box 310
Big Spring, Texas 79720

Math U Matic, Inc.
607 W. Sheridan
Oklahoma City, Oklahoma 73102

Models of Industry
2100 Fifth Street
Berkeley, California 94710

Montgomery Ward and Company

Play school Manufacturing Company
1750 North Lawndale Avenue
Chicago, Illinois 60647

Frederick Post Company
3650 North Avondale Avenue
Chicago, Illinois 60618

Sears, Roebuck and Company

STAS
Instructional Materials, Inc.
2100 Fifth Street
Berkeley, California 94710

The Steck-Vaughn Company
Box 16
Austin, Texas 79167

Tutor Recordings (records only)
Box 327
Bronxville, New York 10708

Wabash Instruments & Specialties Co.
Box 194
Wabash, Indiana 46992

W. M. Welch Scientific Company
1515 Sedgwick Street
Chicago, Illinois 60610

Whitman Publishing Company
1220 Mount Avenue
Racine, Wisconsin 53404

Yoder Instruments
East Palestine, Ohio 44413

PRODUCERS OF ARITHMETIC GAMES

Arithmetic Clinic
4502 Stanford Street
Chevy Chase, Maryland 20015

Cadaco-Ellis, Inc.
1446 Merchandise Mart
Chicago, Illinois 60654

Exclusive Playing Card Company
1139 South Wabash Avenue
Chicago, Illinois 60605

Garrard Press
510 North Hickory Street
Champaign, Illinois 61820

Imout
706 Williamson Building
Cleveland, Ohio 44114

King Enterprises
New City
New York 10956

Kraeg Games
8988 Manchester Road
St. Louis, Missouri 63144

Milton Bradley Company
74 Park Street
Springfield, Massachusetts 01102

Models of Industry, Inc.
2100 Fifth Street
Berkeley, California 94710

Alfreys School Supply Company
7715 East Garvey Boulevard
South San Gabriel, California 91777

Plaway Games
C. N. McRae
Unadilla, New York 13849

Psychological Service
4402 Stanford Street
Chevy Chase, Maryland 20015

School Service Company
4233 Crenshaw Boulevard
Los Angeles, California 90008

Self-teaching Flashers
4402 South 54th Street
Lincoln, Nebraska 68516

APPENDIX III

ACTIVITY PACKAGES

A resource center should be a place where students, free from the pressure of assigned tasks, can pursue mathematical topics which interest them in ways which interest them. It will often be necessary, however, to provide students with guidance both with regard to the kinds of mathematical pursuits available to them and the ways they might start to investigate them. Activity packages are but one of the ways to begin to open the world of mathematics to the students.

Activity packages, as the name would imply, consist of a number of suggested tasks the performance of which will hopefully lead to the acquisition of desirable mathematical qualities in the student or the sharpening of skills and concepts. These suggested tasks may be transmitted, for example, on audio tapes. More often they are printed on cards which have come to be known as "activity cards." The activity package may also contain whatever is needed in the way of resources to perform the tasks. The assignments given to the student on the activity cards may be very prescriptive and closed giving him little or no latitude to determine what the outcomes of his activities might be. The result of his pursuits will be the same as his neighbor's. On the other hand, the cards might suggest more open-ended investigations which will allow him increased freedom in discovering relationships and which will help challenge and develop his inventive powers. The "openness" or "closure" of the suggested task will depend on the goal of the activity and the ability of the student to cope with structure or the lack of it. Generally, open-ended inquiry is preferable.

Activity packages may be purchased from commercial sources or devised by teachers and students themselves. Development by teachers and students has many advantages including economy. Excellent commentary on the design and use of activity cards may be found in the publications *Freedom to Learn: An Active Learning Approach to Mathematics* and *How to Start a Math Lab*.

RESOURCE BOOKS

1. *Freedom to Learn: An Active Learning Approach to Mathematics*, by Edith E. Biggs, James R. MacLean

Addison Wesley (Canada) Ltd.
57 Gervais Drive
Don Mills, Ontario
CANADA

"This book has been written to assist students preparing for a teaching career, experienced teachers, administrators, and all others interested in children and education to become more familiar with an active learning approach. In particular, we have tried to use mathematics to describe what distinguishes an active learning approach and how it might be implemented."

2. *The Laboratory Approach to Mathematics*, by Kidd, Muers, Eillay

Science Research Associates, Inc. (SRA)
259 East Erie Street
Chicago, Illinois 60611

This book defines the laboratory approach, gives rationale for its use and has a wealth of ideas for its implementation. "The strongest aspects of this book . . . are the many examples and ideas that can be used in the classroom. Of special interest is the unit . . . that starts an idea from the beginning and outlines it in detail and is consistent throughout with the laboratory approach."

3. *How to Start a Math Lab*, by Donald Cohen, Charlotte Frank, Bernard Kessler

Olivetti Education Center
155 White Plains Road
Tarrytown, New York 10591

This booklet is one of several published by the Olivetti Education Center. It reflects the philosophy that "the most constructive approach for today's teacher is to concentrate on making his pupils aware of how to learn rather than what to learn Children who have been taught to think humanely, creatively and critically will be well equipped to deal with an unknown and rapidly changing world,"

4. *A Handbook of Aids for Teaching Junior-Senior High School Mathematics*, by Stephen Kurlek (\$2.95)

W. B. Saunders Company
W. Washington Square
Philadelphia, Pennsylvania 19105

"Here is a book that shows how to use common materials -- such as waxed paper, thread, posterboard, and file cards -- to construct devices that will bring mathematics to life in the classroom." The devices are intended for student use to allow him to become involved as an active learner. Aids are divided into categories such as arithmetic, algebraic, geometric, etc.

COMMERCIALLY PRODUCED ACTIVITY CARDS AND ACTIVITY PACKAGES

1. *Independent Exploration Material*, by Madison Project, Math Media Division, H + M Associates, Box 1107, Danbury, Connecticut 06810.
2. *Activity Cards for Independent Exploration*, Concept Company, Box 273, Belmont, Massachusetts 02178.
3. *Retriev-o-math Activity Cards*, by Eugene P. Smith and Carlos White, Midwest Publications Company, Inc., Box 307, Birmingham, Michigan 48012.
4. *Student Activity Cards for Cuisenaire Rods*, by Galton et al Cuisenaire Company of America, Inc., 12 Church Street, New Rochelle, N. Y. 10805.
5. *Mirror Cards, Problem Cards for the Attribute Games*, and other Elementary Science Study Math materials, McGraw-Hill Book Company, Webster Division, Manchester, Missouri 63011.
6. *Green and Red Cards for Grades 6 to 9*, John Wiley & Sons, Pluffield Project, New York, N.Y. 10016.
7. *Geocards*, by Donald Cohen, Walker & Company, 720 Fifth Avenue, New York, N.Y. 10019.
8. *Mathematics Mini-Lab*, by Donald Cohen, SEE, 3 Bridge Street, Newton, Massachusetts 02195.
9. *Tasks and Manual for Use with the Multi-Base Arithmetic Blocks*, by Dienes, Herder & Herder, New York, N.Y. 10016.
10. *The MacMillan Math Activity Cards*, by David Clarkson, MacMillan Company, Toronto, Ontario, CANADA.
11. *Math Lab*, Jack Hood School Supplies Company, Inc., 91-99 Erie Street, Stratford, Ontario, CANADA.
12. *Math Action*, Copp Clark Publishing Company, Montreal, CANADA.
13. *Applied Mathematics Cards*, Schofield & Sims Ltd., 35 St. John's Road, Huddersfield, ENGLAND.
14. *Mathex*, Encyclopedia Britannica Publishers, Ltd., 151 Bloor Street, West, Toronto 5, CANADA.

